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APPLICANTS: Koichi Chotoku et al

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Hon. Commissioner of Patents and Trademarks,
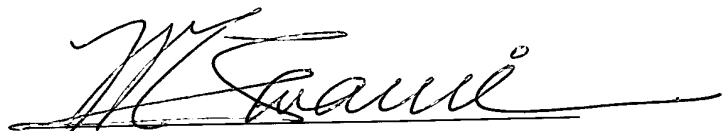   Washington, D.C. 20231

S I R:

CERTIFIED TRANSLATION

I, Masaaki Iwami of 3-22, Asagaya-minami 1-chome, Suginami-ku, Tokyo, Japan, am an experienced translator of the Japanese language into the English language and I hereby certify that the attached comprises an accurate translation into English of Japanese Patent Application No. 2000-212293 filed July 13, 2000.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

February 10, 2006

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Date

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Masaaki IWAMI

[Name of Document]   Specification

[Title of the Invention]   Video-signal recording and playback apparatus, video-signal recording and playback method and recording medium

[What is Claimed is]

[Claim 1]   A video-signal recording and playback apparatus for recording and playing back a video signal of a television-broadcast program, said video-signal recording and playback apparatus comprising:

detection means for detecting relevant information related to a program being recorded; and

modification means for automatically modifying an algorithm of detecting a program-representing picture in dependence of said relevant information.

[Claim 2]   The video-signal recording and playback apparatus according to claim 1 wherein said detection means is capable of detecting information on a genre of a program being recorded.

[Claim 3]   A video-signal recording and playback method adopted in a video-signal recording and playback apparatus for recording and playing back a video signal of a television-broadcast program, said video-signal recording and playback method comprising the steps of:

detecting relevant information related to a program

being recorded; and

automatically modifying an algorithm of detecting a program-representing picture in dependence of said relevant information.

[Claim 4] A recording medium for storing a computer-readable program for controlling a video-signal recording and playback apparatus for recording and playing back a video signal of a television-broadcast program wherein said program comprises the steps of:

detecting relevant information related to a program being recorded; and

automatically modifying an algorithm of detecting a program-representing picture in dependence of said relevant information.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention Pertains]

The present invention relates to a video-signal recording and playback apparatus, a video-signal recording and playback method and a recording medium. More particularly, the present invention relates to a video-signal recording and playback apparatus suitable for a case in which a recommended position to a start an

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operation to playback a video signal from a recording medium is also recorded into a recording medium in an operation to record a video signal into the recording medium, relates to a video-signal recording and playback method adopted in the video-signal recording and playback apparatus and relates to a recording medium for recording a procedure for implementing the video-signal recording and playback method.

[0002]

[Prior Art]

In order to allow the user to grasp the contents of a program recorded on a recording medium or the contents of a group of such programs, or in order to search such a recording medium for a program, there is provided a method whereby a plurality of shrunk static pictures or moving pictures each representing a program or a scene is displayed on a screen and the user is allowed to specify one of the displayed pictures in order to select a desired program or a desired scene of a program.

[0003]

Conventionally, pictures each representing a program or a scene are each obtained right after the beginning of a program or extracted at fixed intervals.

[0004]

[Problems to be Solved by the Invention]

By the way, a representative picture determined by adoption of the method described above may include, for example, both the face of a person and a caption, which are on the display screen at the same time. It is thus quite within the bounds of possibility that such a representative picture suitably represents a recorded program when the genre of the recorded program is "news". It is out of the bounds of possibility, however, that such a representative picture meaningfully represents a recorded program when the genre of the recorded program is a "movie".

[0005]

As a result, there is raised a problem that a representative picture determined by adoption of the method described above is not sufficient means for use by the user to grasp the contents of a program or as a recommended position in determination of a start position of a program.

[0006]

It is thus an object of the present invention addressing the problems described above to provide the user with a capability of grasping the contents of a program and to provide a capability of detecting and

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recording a position usable by the user as a recommended position in determination of a start position of a program.

[0007]

[Means for Solving the Problems]

A video-signal recording and playback apparatus provided by the present invention is characterized in that the video-signal recording and playback apparatus includes detection means for detecting relevant information related to a program being recorded and modification means for automatically modifying an algorithm of detecting a program-representing picture in dependence of the relevant information.

[0008]

The detection means is capable of detecting information on a genre of a program being recorded.

[0009]

A video-signal recording and playback method provided by the present invention is characterized in that the video-signal recording and playback method includes the steps of detecting relevant information related to a program being recorded and automatically modifying an algorithm of detecting a program-representing picture in dependence of the relevant

information.

[0010]

A recording medium provided by the present invention for storing a computer-readable program is characterized in that the program includes the steps of detecting relevant information related to a program being recorded and automatically modifying an algorithm of detecting a program-representing picture in dependence of the relevant information.

[0011]

According to a video-signal recording and playback apparatus and video-signal recording and playback method and a program recorded in the recording medium provided by the present invention, relevant information related to a program being recorded is detected and an algorithm of detecting a program-representing picture is automatically modified in dependence of the relevant information.

[0012]

[Mode for Carrying out the Invention]

A hard disk recorder implemented by a preferred embodiment of the present invention is explained by referring to diagrams as follows.

[0013]

Fig. 1 is a block diagram showing a typical

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configuration of a hard disk recorder. An antenna 1 receives a television broadcast and supplies a signal of the broadcast to a tuner 2. In accordance with a command issued by a system controller 31, the tuner 2 extracts a signal of a program of a predetermined channel from the signal of the television broadcast received from the antenna 1. The extracted signal is supplied to an input switch 5.

[0014]

An external apparatus not shown in the figure supplies an S video signal to a terminal a of a switch 9 by way of an external video input terminal 3-1. An S video signal is separated signals including a Y signal (luminance signal) and a C signal (chrominance signal). An external apparatus not shown in the figure supplies a composite video signal to the input switch 5 by way of an external video input terminal 3-2. An external apparatus not shown in the figure supplies an audio signal to the input switch 5 by way of an external audio input terminal 4.

[0015]

In accordance with a command issued by the system controller 31, the input switch 5 selects a desired signal from the video signal and the audio signal, which

are supplied thereto. If the selected signal is the composite video signal, the input switch 5 supplies the selected composite video signal to a YC circuit 8. If the selected signal is the audio signal, on the other hand, the input switch 5 supplies the selected audio signal to an A/D (Analog to Digital) converter 6.

[0016]

The A/D converter 6 converts an audio signal received from the input switch 5 into digital data by A/D conversion and supplies the digital data to an MPEG (Moving Picture Experts Group) audio encoder 7. The A/D converter 6 also supplies the digital audio data obtained as a result of the A/D conversion to a terminal b of the input switch 25. In accordance with a command issued by the system controller 31, the MPEG audio encoder 7 carries out a compression process adopting an MPEG technique on the digital audio data received from the A/D converter 6 to generate an audio ES (elementary stream). The MPEG audio encoder 7 supplies the audio ES to a multiplexer/demultiplexer 14.

[0017]

In accordance with a command issued by the system controller 31, a YC separation circuit 8 separates a composite video signal received from the input switch 5

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into a luminance signal (Y signal) and a chrominance signal (C signal). The YC separation circuit 8 supplies the Y signal and the C signal to an NTSC (National Television System Committee) decoder 10 by way of a terminal b of the switch 9. In accordance with a command issued by the system controller 31, the switch 9 changes its contact to a terminal a to forward an S signal received from an external apparatus to the NTSC decoder 10. Also in accordance with a command issued by the system controller 31, the switch 9 changes its contact to a terminal b to forward Y and C signals received from the YC separation circuit 8 to the NTSC decoder 10.

[0018]

In accordance with a command issued by the system controller 31, the NTSC decoder 10 carries out processes such as A/D conversion and chroma encode processing on a video signal received from the switch 9 to convert the video signal into a digital component video signal referred to hereafter as picture data. The NTSC decoder 10 supplies the picture data to a video-signal preprocessing circuit 12. The NTSC decoder 10 also generates a clock signal based on a horizontal synchronization signal of a received video signal. In addition, the NTSC decoder 10 supplies a field-

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identifying signal, a vertical synchronization signal and
the horizontal synchronization signal obtained as a
result of synchronous separation to a synchronization-
signal control circuit 11.

[0019]

In accordance with a command issued by the system
controller 31, the synchronization-signal control circuit
11 generates clock and synchronization signals with the
field-identifying signal, the vertical synchronization
signal and the horizontal synchronization from the NTSC
decoder 10 used as a reference. The synchronization-
signal control circuit 11 supplies the generated clock
and synchronization signals to a variety of components.

[0020]

In accordance with a command issued by the system
controller 31, the video-signal preprocessing circuit 12
carries out video signal processing such as pre-filtering
on picture data received from the NTSC decoder 10 to
detect a representative picture. The video-signal
preprocessing circuit 12 supplies the representative
picture to an MPEG video encoder 13 and a video-signal
post-processing circuit 20. In accordance with a command
issued by the system controller 31, the MPEG video
encoder 13 carries out an encoding process such as DCT

(Discrete Cosine Transform) processing on picture data received from the video-signal preprocessing circuit 12 to generate an elementary stream of the picture. The MPEG video encoder 13 supplies the elementary stream to the multiplexer/demultiplexer 14.

[0021]

In accordance with a command issued by the system controller 31, in a recording operation, the multiplexer/demultiplexer 14 multiplexes an elementary stream of a picture and an audio elementary stream, which has completed compression adopting the MPEG technique, as well as a variety of control signals to generate typically an MPEG TS (transport stream). The multiplexer/demultiplexer 14 supplies the MPEG TS to a buffer controller 17. In a playback operation, on the other hand, the multiplexer/demultiplexer 14 demultiplexes an MPEG TS received from the buffer controller 17 to extract a PES (Packetized Elementary Stream) from the MPEG TS. The multiplexer/demultiplexer 14 supplies the extracted PES to an MPEG AV decoder 19.

[0022]

In accordance with a command issued by the system controller 31, the buffer controller 17 executes control to intermittently supply a transport stream received

continuously from the multiplexer/demultiplexer 14 to an HDD (Hard Disk Drive) 18. While the HDD 18 is carrying out a seek operation, for example, a transport stream cannot be written into a hard disk of the HDD 18. In this case, the transport stream is stored temporarily in a buffer. As the seek operation is completed, allowing a transport stream to be written into the hard disk, the stream is read out from the buffer and stored into the hard disk at a rate higher than a rate of inputting data to the buffer. In this way, a transport stream received continuously from the multiplexer/demultiplexer 14 can be all written into the hard disk of the HDD 18.

[0023]

The buffer controller 17 also executes control to store signal received from the HDD 18 intermittently into a buffer so that the stored signal can be supplied to the multiplexer/demultiplexer 14 as a continuous transport stream.

[0024]

In accordance with a command issued by the system controller 31, the HDD 18 stores a transport stream received from the buffer controller 17 intermittently into the hard disk at a predetermined address. The HDD 18 also seeks a predetermined address, reads out a transport

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stream from the address and supplies the stream to the buffer controller 17.

[0025]

The buffer controller 17 and the HDD 18 adopt an IDE (Integrated Drive Electronics) protocol. It should be noted, however, that any protocol can be adopted in the present invention as long as the protocol is used for recording a transport stream.

[0026]

In accordance with a command issued by the system controller 31, the MPEG AV decoder 19 separates a PES received from the multiplexer/demultiplexer 14 into a video elementary stream and an audio elementary stream. The MPEG AV decoder 19 then carries out a predetermined decoding process on the elementary streams, supplying video data of a base band to the video-signal post-processing circuit 20 and audio data of the base band to a audio-signal post-processing circuit 24.

[0027]

In accordance with a command issued by the system controller 31, the video-signal post-processing circuit 20 switches the input from a video signal supplied by the video-signal preprocessing circuit 12 to video data of the base band supplied by the MPEG AV decoder 19 or vice

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versa, and synthesizes the video signal and the video data. The video-signal post-processing circuit 20 also carries out filtering on the input data and supplies the filtered data to an on-screen display circuit 21. In addition, the video-signal post-processing circuit 20 also generates a GUI (Graphic User Interface) for displaying pictures and generates a representative picture of a program represented by picture data. The video-signal post-processing circuit 20 then pastes the representative picture of a program on a window and supplies the window to the on-screen display circuit 21.

[0028]

In accordance with a command issued by the system controller 31, the on-screen display circuit 21 converts text information into corresponding picture data and superposes the picture data obtained as a result of the conversion on picture data received from the video-signal post-processing circuit 20. The on-screen display circuit 21 then supplies the superposed picture data to an NTSC encoder 22. In accordance with a command issued by the system controller 31, the NTSC encoder 22 converts picture data (component digital signal) received from the on-screen display circuit 21 into Y and C signals. Then, the NTSC encoder 22 generates an S video signal

completing a D/A conversion process and an analog composite video signal. The NTSC encoder 22 supplies the S video signal completing a D/A conversion process and the analog composite video signal to an external apparatus through external video output terminals 23-1 and 23-2 respectively.

[0029]

In accordance with a command issued by the system controller 31, the audio-signal post-processing circuit 24 carries out processes such as filtering, fading and conversational-speed conversion on audio data of the base band received from the MPEG AV decoder 19, supplying a result of the processes to a terminal a of a switch 25.

[0030]

In accordance with a command issued by the system controller 31, the switch 25 sets its contact at a terminal a to supply audio data received from the audio-signal post-processing circuit 24 to a D/A converter 26, or a terminal b to supply audio data received from the A/D converter 6 to the D/A converter 26. The D/A converter 26 converts audio data received from the switch 25 into analog data in D/A conversion and supplies the analog data to an external apparatus by way of an external audio output terminal 27.

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[0031]

The system controller 31 reads out a program from a ROM (Read-Only Memory) 33 through a host bus 32 and executes the program to control other components. A RAM (Random-Access Memory) 34 is used as needed for storing a program and data which are required for controlling the other components. The system controller 31, the ROM 33 and the RAM 34 are connected to each other and to an input/output interface 35 by the host bus 32. The input/output interface 35 is connected to a drive 36 for driving a magnetic disk 41, an optical disk 42, a magneto-optical disk 43 or a semiconductor memory 44. The input/output interface 35 is also connected to an input unit 37 including a keyboard, a mouse, buttons, switches and a remote commander and so forth.

[0032]

The hard disk recorder is capable of inputting and outputting not only an analog signal, but also digital data. For example, an IRD (Integrated Receiver Decoder) not shown in the figure is allowed to supply a transport stream to a digital interface 15 through an IEEE (the Institute of Electrical and Electronics Engineers)-1394 serial bus connected to a digital input/output terminal 16. In accordance with a command issued by the system

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controller 31, the digital interface 15 carries out an interfacing process to supply the input transport stream to the multiplexer/demultiplexer 14. In accordance with a command issued by the system controller 31, the multiplexer/demultiplexer 14 outputs the transport stream received from the digital interface 15 to the buffer controller 17.

[0033]

The multiplexer/demultiplexer 14 also outputs a transport stream received from the buffer controller 17 to the digital interface 15. The digital interface 15 supplies the transport stream received from the multiplexer/demultiplexer 14 to the external IRD through a digital input/output terminal 16 and the IEEE 1394 serial bus. The IRD outputs the transport stream on a monitor connected thereto to be displayed on the monitor.

[0034]

In this embodiment, the hard disk recorder is connected to the IRD as described above. It should be noted, however, that the scope of the present invention is not limited to this configuration. For example, the hard disk recorder can also be connected to a personal computer or another apparatus.

[0035]

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In addition, while a video signal is compressed by adoption of the MPEG technique, the scope of the present invention is not limited to this technique. That is to say, other compression techniques can also be adopted.

[0036]

Furthermore, in place of a hard disk of the HDD 18, it is also possible to use other recording media such as an optical disk, a magneto-optical disk and a solid-state memory.

[0037]

The following description explains a method based on information on a program to modify an algorithm used in detection of a representative picture by the video-signal-preprocessing circuit 12.

[0038]

With this method, it is possible to detect a picture including a caption, a picture including the face of a person, a bright picture such as computer graphics and other pictures.

[0039]

An evaluation value representing the degree of importance is attached to a representative picture obtained by adoption of this method. A representative picture with a largest evaluation value among

representative pictures detected for an entire program by adoption of this method is used as a representative picture that best represents the contents of the program.

[0040]

The following description explains a method of using program-genre information of SI (Service Information) included in a broadcast signal such as a BS digital broadcast or a CS digital broadcast as a typical method of using program information. In accordance with a portion of operating prescriptions known as ARIB TR-B15 for describing the BS digital broadcast, SI is classified into large categories and medium categories. The large categories include news, sports, dramas and varieties whereas the medium categories include weather forecasts, politics, discussions and local news for a large category of news. By analyzing the SI of a program or a channel being recorded, information on a genre can be obtained.

[0041]

As a method of detecting a representative picture, detection of types 1, 2, 3 and 4 is considered hereinafter. Type 1 is the type of screens each including the face of a person and a caption. Type 2 is the type of screens each having bright colors such as ones appearing in computer graphics. Type 3 is the type of screens each

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appearing at fixed intervals such as 5 minutes. Type 4 is the type of screens each appearing right after a commercial message.

[0042]

The following description explains a method of determining weighting of representative pictures while recording 2 programs, namely, news or genre 1 and a variety or genre 2, by referring to a flowchart shown in Fig. 2.

[0043]

As shown in the figure, the flowchart begins with a step S1 when a recording operation is started. At the step S1, information on a genre is acquired from SI of a program being recorded. At the next step S2, the video-signal-preprocessing unit 12 forms a judgment as to whether or not a frame to be recorded can serve as a representative picture.

[0044]

If the outcome of the judgment formed at the step S2 indicates that a frame to be recorded can serve as a representative picture, the flow of the processing goes on to a step S3 at which an evaluation value of the detected representative picture is determined on the basis of the information on the genre and the type of the

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picture. To put it in detail, an evaluation value found from a table like one shown in Fig. 3 is attached to the representative picture. For example, if the program being recorded is genre 1 and the type of the representative picture obtained from the video-signal-preprocessing circuit 12 is type 1, an evaluation of 80 is given to the representative picture. For the same genre 1, an evaluation of 20 or 10 is given to the representative picture in the case of type 2 or type 3 respectively. The same evaluation is given to the representative picture as in the program being recorded in genre 2.

[0045]

Then, at the next step S4, the evaluation value given to the representative picture at the step S3 is stored in a recording medium as information on the representative picture. The stored evaluation value is used in presentation of the representative picture representing a program at a start of a playback operation or in presentation of a recommended starting position in a program in the playback operation to the user.

[0046]

By carrying out the processing described above, it is possible to automatically change the type of a representative picture which has a great degree of

importance in accordance with the genre of the program. As a result, a picture including a caption and the face of a person can be detected at a high priority in the case of a news program. In the case of a variety, on the other hand, a picture with bright colors can be detected at a high priority. If such pictures are not detected, a representative picture is selected between a picture at the beginning of the program upon completion of a commercial message and pictures detected at fixed intervals.

[0047]

The flow of the processing then goes on to a step S5 to form a judgment as to whether or not the operation to record the program has ended. If the recording operation has not been completed, the pieces of processing at the steps S2 to S5 are carried out again repeatedly till the recording operation is completed.

[0048]

The following description explains a method, whereby the user utilizes a representative picture to start an operation to play back a title, by referring to a flowchart shown in Fig. 4.

[0049]

A display unit as an external apparatus shows a set

of representative pictures A to E each representing a title pertaining to a group of titles recorded on the hard disk of the hard disk drive 18 as shown in Fig. 5. The selected representative picture is highlighted and an enlarged picture is shown at an F position. The displayed representative pictures are each referred to hereafter as a thumbnail. The flowchart shown in Fig. 4 begins with a step S11 at which the user moves the cursor to one of the thumbnails that represents a desired program to select and play back the program.

[0050]

At the next step S12, information on the position of the selected representative picture representing a start of a playback operation is read out from the hard disk of the hard disk drive 18.

[0051]

At the next step S13, the location of a stream required in starting of an operation to play back the stream is detected from the retrieved information on the position of the frame. Data is then read out from the location in the hard disk of the hard disk drive 18 to start the playback operation.

[0052]

It should be noted that, while a genre included in

SI is used in this embodiment, EPG information superposed on a ground broadcast can also be used to carry out the same processing. In addition, if a genre can be acquired from information obtained from a network such as the Internet, the same processing can also be carried out. Information on a genre and/or information on a program, which are presented by using a recording medium such as an optical disk, can also be used. In addition, information on a genre set manually by the user can also be used.

[0053]

Furthermore, besides information on a genre of a program, other information can also be used for automatically changing the algorithm of detecting a representative picture. For example, the position of a representative picture or information on each scene may be directly distributed as information on a program. In this case, it is possible to set an algorithm whereby the distributed information is used for determining a representative picture.

[0054]

Moreover, if special-service information including urgent news or the like can be obtained as information on a program, an algorithm of detecting a representative

picture in the scene can be changed to another algorithm

whereby the representative picture with the greatest

degree of importance is switched to the scene of an

urgent news.

[0055]

By the way, the series of pieces of processing

described above can be carried out by hardware or through

execution of software. When execution of software is

selected for carrying out the series of pieces of

processing, a variety of programs composing the software

are executed by a computer incorporated in special

hardware. As an alternative, the programs are installed

from a recording medium into a recording memory employed,

for example, in a general-purpose personal computer

capable of executing the various programs to carry out

the pieces of processing.

[0056]

As shown in Fig. 1, recording media for presenting

a program to the user is distributed separately from the

computer. In order to present a program to the user,

package media such as the magnetic disk 41 including a

floppy disk, the optical disk 42 including a CD-ROM

(Compact-Disk Read-Only Memory) and a DVD (Digital

Versatile Disk), the magneto-optical disk 43 including an

MD (Mini Disc) and the semiconductor memory 44 are generally used. However, the use of such package media is not mandatory. As an alternative, a program can also be presented to the user by incorporating the program in the computer in advance. That is to say, the program is stored in a ROM or a hard disk included in the HDD.

[0057]

It should be noted that, in this specification, while steps prescribed in a program recorded in a recording medium can of course be executed sequentially along the time axis in an order the steps are prescribed in the program, the steps are not always executed sequentially along the time axis. That is to say, a program may include steps that are executed concurrently or independently.

[0058]

In addition, the technical term 'system' used in this specification means the whole equipment including a plurality of apparatuses.

[0059]

[Effects of the Invention]

As described above, a video-signal recording and playback apparatus, a video-signal recording and playback method and program of recording medium provided by the

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present invention can detect relevant information related
to a program being recorded and automatically modifying
an algorithm of detecting a program-representing picture
in dependence of the relevant information. Therefore the
user can grasp the contents of a program, and detect and
record a position usable by the user as a recommended
position in determination of a start position of a
program.

[Brief Description of the Drawings]

　[Fig. 1]

　　　Fig. 1 is a block diagram showing a typical
configuration of a hard disk recorder implemented by an
embodiment of the present invention.

　[Fig. 2]

　　　Fig. 2 is a flowchart representing operations to
record a video signal into a hard disk recorder.

　[Fig. 3]

　　　Fig. 3 is a diagram showing a typical table for
determining an evaluation value from a genre and the type
of a detected representative picture in the embodiment of
the present invention.

　[Fig. 4]

　　　Fig. 4 shows a flowchart representing operations to

play back a video signal from the hard disk recorder.

[Fig. 5]

Fig. 5 is a diagram showing a typical Graphical

User Interface displayed on a monitor at the start of a

playback operation.

[Description of Reference Numerals]

12: Video-signal preprocessing circuit, 13: MPEG

video encoder, 14: Multiplexer/demultiplexer, 17: Buffer

controller, 18: Hard Disk Drive, 19: MPEG AV decoder, 20:

Video-signal post processing circuit, 21: On-screen

display circuit, 24: Audio-signal post-processing circuit,

31: System controller, 32: Host bus, 33: ROM, 34: RAM,

36: Drive, 41: Magnetic disk, 42: Optical disk, 43:

Magneto-optical disk, 44: Semiconductor memory, 52:

Characteristic detecting device. 53: Scene change

detecting device, 54, 61: Signal processing circuit, 62:

Memory, 71: Signal processing circuit, 72: Memory.

[Name of Document]   Abstract of the Disclosure

[Abstract]

[Object]   To provide a capability of detecting a position usable by the user as a recommended position in determination of a start position of a program.

[Solving Means]   If the outcome of the judgment formed at the step S2 indicates that a frame to be recorded can serve as a representative picture, the flow of the processing goes on to a step S3 at which an evaluation value of the detected representative picture is determined on the basis of the information on the genre and the type of the picture. Then, at the next step S4, the evaluation value given to the representative picture at the step S3 is stored in a recording medium as information on the representative picture. The stored evaluation value is used in presentation of the representative picture representing a program at a start of a playback operation or in presentation of a recommended starting position in a program in the playback operation to the user.

[Selected Drawing]   Fig. 2

In the drawings:

[Fig. 1]

A: Hard disk recorder

2: Tuner

5: Input switch

6: A/D converter

7: MPEG audio encoder

8: YC separation circuit

10: NTSC decoder

11: Synchronization-signal control circuit

12: Video-signal preprocessing circuit

13: MPEG video encoder

14: Multiplexer/demultiplexer

15: Digital interface

17: Buffer controller

19: MPEG AV decoder

20: Video-signal post processing circuit

21: On-screen display circuit

22: NTSC encoder

24: Audio-signal post-processing circuit

26: D/A converter

31: System controller

35: Input/output interface

36: Drive

37: Input unit

[Fig. 2]

1: Start

S1: Acquire information on a genre from SI of a currently selected channel

S2: A representative picture?

S3: Compute an evaluation value by using a conversion table

S4: Record the evaluation value onto the recording medium

S5: End of recording?

2: End

[Fig. 3]

1: Genre 1

2: Genre 2

3: Other

4: Type 1

5: Type 2

6: Type 3

7: Table for determining an evaluation value

[Fig. 4]

1: Start

S11: Select a playback thumbnail

S12: Read out a playback start position

S13: Play back a video signal from the playback start

31

position

2: End

[Fig. 5]

1: Example of a display of a selecting playback thumbnail